



THE PLANKTON NEWS



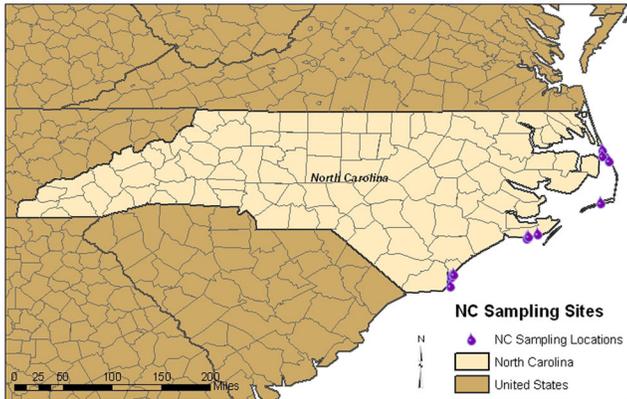
THE NEWSLETTER OF THE SOUTHEAST PHYTOPLANKTON MONITORING NETWORK

Volume 4, Issue 1

April 2005

SEPMN Welcomes North Carolina

In the 2nd week of February, 13 new sites were added to the SouthEast Phytoplankton Monitoring Network. Three workshops were held to recruit volunteers who lived in areas around Nags Head, Beaufort and Morehead City, and Wilmington, North Carolina. Local school teachers, college professors, the North Carolina Aquarium and the Maritime Museum are just some of the volunteers that want to learn more about the phytoplankton communities in their water. We were excited to find the phytoplankton diversity change as we moved down the coast.



One reason North Carolina is an important addition to our network is because in November 1987, there was a large harmful algal bloom that impacted most of the North Carolina coastline. (Tester, et al. 1991) Toxic *Karenia brevis* blooms occurred in Florida and then drifted into the Gulf Stream and made its way to North Carolina. Currents and winds pushed the bloom inland, where it stayed for 4-5 months along the coast. During the bloom, there were 48 documented cases of neurotoxic shellfish poisoning (NSP) and an estimated economic loss of \$24 million in tourism seafood sales.

SEPMN would like to give special thanks to Terri Kirby Hathaway from NC Sea Grant and Amy Sauls from NC National Estuarine Research Reserve for their assistance.

Tester PA, Stumpf RP, Vukovich FM, Fowler PK, Turner JT. An expatriate red tide bloom: transport, distribution and persistence. *Limnol Oceanogr* 1991; 36: 1053-1061.

Plankton Researchers

Porter-Gaud 9th grade science class taught by Allene Barans became Phytoplankton Researchers for two weeks to learn more about individual phytoplankton species. Each student discovered cell size and structure, habitat, ecology, and life cycles of their particular phytoplankton. They also learned how to access general research information.



During this project, students were able to use computer skills to research information on the internet; skills in graphic design using programs like Word, Publisher, and WordArt to create an information sheet; and utilize their artistic and creative talents. "We are always challenged to teach "across the curriculum"; this allows students to use skills learned in other courses."

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Ask the Scientist

Since this past fall, we have been visiting schools up and down the Southeast coast talking about toxic Phytoplankton. We have been very impressed as to some of the questions the students have been challenging us with. Sometimes there is no better way to get the answer than to go to the experts!

Are there any toxic freshwater species?

Jordan Walton, Burke HS

Answer: Yes, there are freshwater algae that produce secondary metabolites (compounds not used in metabolic processes) that have toxic effects on humans and other animals. The phylum that contain these freshwater organisms are called cyanobacteria (or blue-green algae). The toxin concentrations produced by these organisms are normally very low and do not have an effect on us except in heavy bloom situations. The genres that are known to be toxic include *Aphanizomenon*, *Anabaena*, and *Lyngbya* which produce neurotoxins. Liver toxin species include *Microcystis*, *Cylindrospermopsis*, *Nodularia*. *Lyngbya* may also produce compounds that can cause skin rashes. We still don't fully understand or know all the toxic organisms out there.

Wesley C. Jackson, Jr., MSc.

Ph.D. Student @ Medical University of South Carolina

What is the life expectancy of plankton?

James Island Charter HS, Senior Science class

Answer: A very good, but kind of tricky question. Phytoplankton are one-celled organisms and most can continue dividing (i.e., one cell produces two identical cells) for as long as they have enough nutrients and the temperature and light conditions are good...in other words, they will reproduce as long as they are happy campers. Most phytoplankton generally divide once every one to two days. If, however, a phytoplankton cell is eaten by a zooplankton grazer, it's usually the 'end of the road' for the little guy. In this way, phytoplankton are thought of as the 'grass of the sea,' serving as the foundation or base of marine food webs...just like grass and other plants do on land. Amazingly, there are some types of phytoplankton that have very protective cell walls and can be eaten by a grazer, pass right on through, and still live to divide another day!

Dr. Gregory J. Doucette

Marine Biotoxins Program, NOAA/NOS

If you have a question about toxic phytoplankton we will post it in the next edition. Send your question, name, grade and school to The Plankton News. See page 5 for mailing address.

Students Present SEPMN Poster

On February 28, 2005, two 11th grade students from Porter-Gaud School in Charleston, SC along with NOAA's Southeast Phytoplankton Monitoring Network (SEPMN) program coordinator Wendy Wicke presented a scientific poster entitled "Volunteer Monitoring Increases Knowledge of Southeast Phytoplankton Communities" at the Southeastern Estuarine Research Society (SEERS) meeting in Charleston, SC.

The staff at SEPMN sent requests to our volunteer teachers to recruit two students to attend the meeting. The goal was to give students a chance to demonstrate that even high school students can contribute to scientific research projects and to give recognition to our student volunteers (mostly grades 5-12) that participate in our program. This meeting also provided the opportunity to learn about current science research projects and interact with scientists that work in the community.

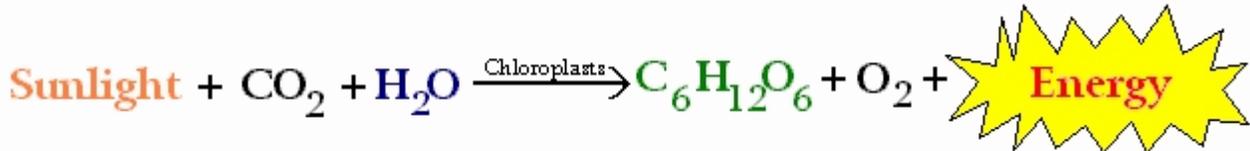
During the meeting, Ben Halpern and Mark Pacult spoke with various scientists and researchers about monitoring for phytoplankton and harmful algal blooms along the southeast Atlantic coast. One student stated "I was impressed that so many people were interested in our project and that they came up and talked to us about it." Ben and Mark also mingled with other scientists and discussed other projects that were presented at meeting. Some of the things they learned include benthic ecology, shrimp and oyster ecology, and water quality assessments. The second student stated "I found it interesting that so many people are monitoring coastal waters, seeing all the projects helped me to understand how important it is to monitor our waters."



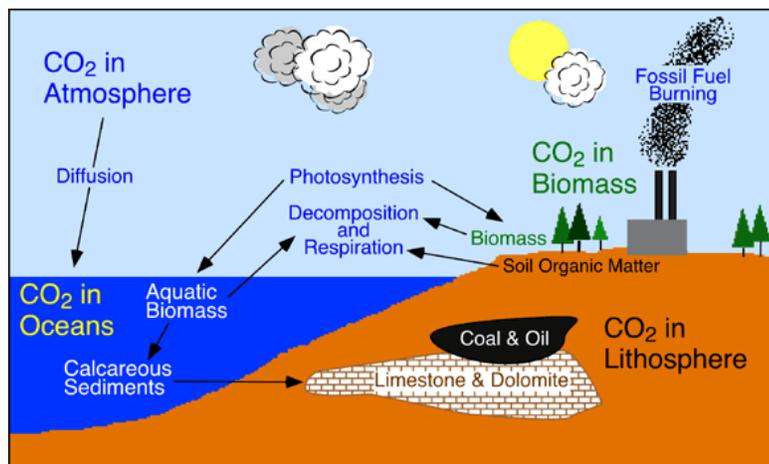
Porter-Gaud 11th grade students discuss SEPMN with a local scientist.

The Carbon Cycle

Phytoplankton carry big responsibilities in the ocean and the atmosphere. Not only are these marine plants producing the majority of the food and oxygen supply in the ocean, but they are also a big part of the oxygen we breathe and the carbon cycle. What is the carbon cycle? *The carbon cycle is the conversion of carbon dioxide into carbohydrates, oxygen, and energy during photosynthesis and the return of carbon dioxide to the atmosphere by animal metabolism and decomposition.* In order for phytoplankton to live, the carbon dioxide in the water is converted into food by a process called photosynthesis. The carbon dioxide is returned to the environment either through animal wastes or death/decomposition. With that said the amount of carbon dioxide (CO₂) in the atmosphere and in the water column try to stay in equilibrium through natural diffusion between the atmosphere and the water surface. Carbon Dioxide (CO₂) is very soluble in water. It can remain as CO₂ or convert to CO₃²⁻-(carbonate) or HCO₃⁻ (bicarbonate) once it is in the water column. The amount of CO₂ that enters the water depends on the temperature of the water surface. Colder waters can diffuse more CO₂ than warmer waters. So how is this all related to phytoplankton again? Well, the phytoplankton uses the CO₂ and converts it into oxygen (O₂) through photosynthesis. Remember this?



Larger phytoplankton communities will provide greater CO₂ exchange from the atmosphere than smaller phytoplankton communities. Like land plants, phytoplankton contain carbon and when they die or get eaten, this carbon can take one of three paths. It can stay in the organism and be used for growth. The carbon can be respired by the organism in the form of CO₂ or it can be excreted in waste called dissolved organic carbon (DOC) and fall to the bottom. Marine bacteria turn some of the DOC back into CO₂ through respiration. Some of the carbon will stay at the bottom and act as a land fill and eventually get incorporated into sediment. This will, in turn, allow the surface water to absorb more CO₂ from the atmosphere. Some scientists find phytoplankton communities very important for our future, because of the decreasing population of land plants through deforestation. Land plants also lower the CO₂ levels in the atmosphere through photosynthesis. The larger the world's phytoplankton population, the more carbon dioxide gets pulled from the atmosphere.



References:

- edc.usgs.gov/glis/hyper/glossary/c_d
- http://van_hep.uiuc.edu/van/qa/section/EverythingElse/Plants/20020821214318.htm
- <http://library.thinkquest.org/3017/photosynthesis.htm>

Garrison, Tom. 2005. *Oceanography: An Invitation to Marine Science, 5th edition*. Pacific Grove, California: Brooks-Cole / Thomson Learning.

Name Change Notice

SEPMN Program Coordinator Wendy Perry has changed her name to Wendy Wicke. Please make note of the change in your address books. Her new email address is Wendy.Wicke@noaa.gov.

Calendar of Events

National Science Teachers Association National Convention "Deep in the Heart of Science"

Phytoplankton Fun

Adam's Mark Hotel Dallas, Lone Star Ballroom B

Thursday, March 31, 2005; 9:15 am – 9:45 am

Dallas, Texas

March 31 – April 3, 2005

South Carolina Marine Educators' Association Annual Conference

Plankton Wars!

Francis Marion Conf. Rm. A

Sunday, April 10 at 8:30 am

Litchfield Beach and Golf Resort, South Carolina

April 8-10, 2005

National Marine Educators' Association "Look to the Source, Look to the Sea" Annual Conference

Fun with Phytoplankton!

3-hour hands-on workshop

Kahului, Maui Hawai'i

July 11-16, 2005

Outreach Activities

Make your own plankton net. All grades

<http://www.biosci.ohiou.edu/faculty/currie/ocean/makeanet.htm>

What is the Carbon Cycle? Grades 6-9

http://www.ucar.edu/learn/1_4_2_15t.htm

Life in the Ocean. Grades 5-8

http://www.intandem.com/NewPrideSite/Asia/Lesson7/Lesson7_Tchr.html

Coastal North Carolina Activity Book. Grade K-5

www.nccos.noaa.gov/education/cbbook/ncbook.pdf

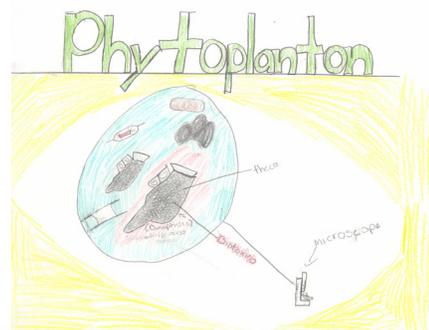
Interested in a career in the marine sciences? You're in the right place! www.marinecareers.net

Plankton Art Contest!

The next art contest will be to create recycled plankton. We want you to use old magazines, newspapers, cereal boxes, any recycled paper or cardboard product. Your collage should be no larger than 8"x11"; you can also use pencil and paint. Your plankton can be 2-D or 3-D. Choose and create your favorite recycled plankton (zooplankton or phytoplankton). Remember to put your name, grade and teacher's name on the back. Judges be looking at the different recycled materials you used to create realistic plankton. Entry deadline, June 31, 2005. Prizes will be awarded to the winners. Be creative and have fun!

Phytoplankton Art Contest Winner!

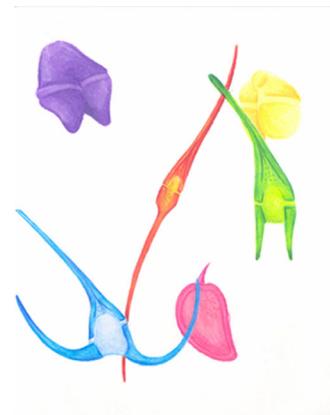
We want to congratulate all of the artists that submitted art work to the Phytoplankton Art Contest. We had over 95 entries! Unfortunately, we can only choose one winner from three categories based on grade levels (5th – 8th, 9th – 10th, and 11th – 12th grades). Congratulations!



Allison Avery, St. Mary's Elementary School 5th



Anna Morrison, Porter-Gaud 9th



Megan Mouzon, Fort Dorchester HS 11th

You can send your artwork by mail to:

Julie Cahill, SEPMN
219 Fort Johnson Rd.
Charleston, SC 29412
Ph. (843) 762-8657

We would like to thank the South Carolina Aquarium for donating passes to the aquarium for all of our winners!

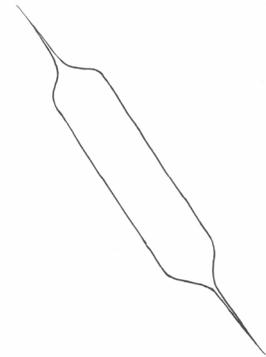
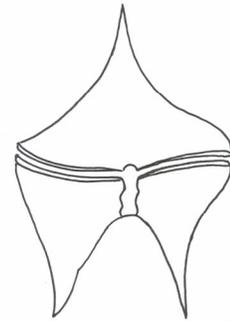
Student Activity Page

Harmful Algae word find

A T P B A N O X I C F S H
A L G A J T F M O P E E
H R G L A F A C K H G U T
L E F A K H I S E Y P E H
P D T O E X P S M Y G L U
J T S J O B D H J C R D
H I A T H D E N K U I L A
F D A Y Y K W A L I L A K
T E S P F G A E E L L E Y
B L O O M J B E B Y S L S

Can you find 7 words that have to do with harmful algae in the word find?

Below are 2 draws of phytoplankton. Color them in and then draw your own.



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Monitoring Network (SEPMN)
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CCEHBR
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Southeast Phytoplankton Monitoring Network

Promoting a better understanding of
Harmful Algal Blooms by way of Volunteer Monitoring

Partnering With:



Southeast Phytoplankton Monitoring Network (SEPMN)
NOAA/NOS/National Centers for Coastal Ocean Science
Center for Coastal Environmental Health and Biomolecular Research
219 Fort Johnson Road
Charleston, SC 29412
